

**CPC****COOPERATIVE PATENT CLASSIFICATION****F23B****METHODS OR APPARATUS FOR COMBUSTION USING ONLY SOLID FUEL** ( { for combustion of fuels that are solid at room temperatures, but burned in

melted form, e.g. candle wax, [C11C 5/00](#), [F23C](#) , [F23D](#) ; using solid fuel suspended in air [F23C](#) , [F23D 1/00](#) ; using solid fuel suspended in liquids [F23C](#) , [F23D 11/00](#); using solid fuel and fluent fuel simultaneously or alternately [F23C](#) , [F23D 17/00](#); burning of low grade fuel [F23G](#) ; grates [F23H](#) ; feeding solid fuel to combustion apparatus [F23K](#) ; combustion chambers, not otherwise provided for [F23M](#) ; domestic apparatus [F24](#) ; central heating boilers [F24D](#) ; package boilers [F24H](#) } )

**NOTE**

This subclass is only concerned with the combustion of lump fuel, or of pulverulent or granulated fuel if no use is made of its fluent nature.

**Guidance heading:** IPC7 groups

**F23B 1/00****Combustion apparatus using only lump fuel**

- [F23B 1/02](#) . for indirect heating of a medium in a vessel, e.g. for boiling water ( [steam generation](#)[F22](#) )
- [F23B 1/04](#) . . External furnaces, i.e. with furnace in front of the vessel
- [F23B 1/06](#) . . . for heating water-tube boilers, e.g. Tenbrink flue furnaces
- [F23B 1/08](#) . . Internal furnaces, i.e. with furnaces inside the vessel
- [F23B 1/10](#) . . . for heating locomotive boilers
- [F23B 1/12](#) . . with a plurality of combustion chambers
- [F23B 1/16](#) . the combustion apparatus being modified according to the form of grate or other fuel support { for incinerators[F23G 5/002](#) }
- [F23B 1/165](#) . . { using roller grate }
- [F23B 1/18](#) . . using inclined grate
- [F23B 1/20](#) . . using step-type grate
- [F23B 1/22](#) . . using travelling grate
- [F23B 1/24](#) . . using rotating grate
- [F23B 1/26](#) . . using imperforate fuel supports
- [F23B 1/28](#) . . using ridge-type grate, e.g. for combustion of peat, sawdust, or pulverulent fuel { ( combustion of peat, sawdust [F23G 7/10](#) ) }
- [F23B 1/30](#) . characterised by the form of combustion chamber
- [F23B 1/32](#) . . rotating
- [F23B 1/34](#) . . annular
- [F23B 1/36](#) . . shaft-type
- [F23B 1/38](#) . . for combustion of peat, sawdust, or pulverulent fuel on a grate or other fuel support { ( combustion of peat, sawdust [F23G 7/10](#) ) }

<b>F23B 3/00</b>	<b>Combustion apparatus which is portable or removable with respect to the boiler or other apparatus which is heated</b>
<b>F23B 5/00</b>	<b>Combustion apparatus with arrangements for burning uncombusted material from primary combustion { ( combustion apparatus characterised by the combination of two or more combustion chambers <a href="#">F23C 6/00</a>; the primary combustion being pulverulent fuel <a href="#">F23C 9/003</a> ) }</b>
<a href="#">F23B 5/02</a>	. in main combustion chamber
<a href="#">F23B 5/025</a>	. . { recirculating uncombusted solids to combustion chamber }
<a href="#">F23B 5/04</a>	. in separate combustion chamber ; on separate grate
<b>F23B 7/00</b>	<b>Combustion techniques ; Other solid-fuel combustion apparatus</b>
<a href="#">F23B 7/002</a>	. { characterised by gas flow arrangements }
<a href="#">F23B 7/005</a>	. . { with downdraught through fuel bed and grate }
<a href="#">F23B 7/007</a>	. . { with fluegas recirculation to combustion chamber }
<b>F23B 10/00</b>	<b>Combustion apparatus characterised by the combination of two or more combustion chambers</b>
<a href="#">F23B 10/02</a>	. including separate secondary combustion chambers
	<b><u>WARNING</u></b>
	Group <a href="#">F23B 10/02</a> is not complete pending a reorganisation. See also groups <a href="#">F23B 10/00</a>
<b>F23B 20/00</b>	<b>Combustion apparatus specially adapted for portability or transportability</b>
<b>F23B 30/00</b>	<b>Combustion apparatus with driven means for agitating the burning fuel; Combustion apparatus with driven means for advancing the burning fuel through the combustion chamber</b>
<a href="#">F23B 30/02</a>	. with movable, e.g. vibratable, fuel-supporting surfaces; with fuel-supporting surfaces that have movable parts
<a href="#">F23B 30/04</a>	. . with fuel-supporting surfaces that are rotatable around a horizontal or inclined axis and support the fuel on their inside, e.g. cylindrical grates
<a href="#">F23B 30/06</a>	. . with fuel supporting surfaces that are specially adapted for advancing fuel through the combustion zone
<a href="#">F23B 30/08</a>	. . . with fuel-supporting surfaces that move through the combustion zone, e.g. with chain grates
<a href="#">F23B 30/10</a>	. . . with fuel-supporting surfaces having fuel advancing elements that are movable, but remain essentially in the same place, e.g. with rollers or reciprocating grate bars

- F23B 40/00**      **Combustion apparatus with driven means for feeding fuel into the combustion chamber**
- F23B 40/02      . the fuel being fed by scattering over the fuel-supporting surface
- F23B 40/04      . the fuel being fed from below through an opening in the fuel-supporting surface
- F23B 40/06      . the fuel being fed along the fuel-supporting surface
- F23B 40/08      . . into pot- or through-shaped grates
- F23B 50/00**      **Combustion apparatus in which the fuel is fed into or through the combustion zone by gravity, e.g. from a fuel storage situated above the combustion zone**
- F23B 50/02      . the fuel forming a column, stack or thick layer with the combustion zone at its bottom
- F23B 50/04      . . the movement of combustion air and flue gases being substantially transverse to the movement of the fuel
- F23B 50/06      . . the fuel gases being removed downwards through one or more openings in the fuel-supporting surface
- F23B 50/08      . . with fuel-deflecting bodies forming free combustion spaces inside the fuel layer
- F23B 50/10      . . with the combustion zone at the bottom of fuel-filled conduits ending at the surface of a fuel bed
- F23B 50/12      . the fuel being fed to the combustion zone by free fall or by sliding along inclined surfaces, e.g. from a conveyer terminating above the fuel bed
- F23B 60/00**      **Combustion apparatus in which the fuel burns essentially without moving**
- F23B 60/02      . with combustion air supplied through a grate
- F23B 70/00**      **Combustion apparatus characterised by means returning solid combustion residues to the combustion chamber**
- F23B 80/00**      **Combustion apparatus characterised by means creating a distinct flow path for flue gases or for non-combusted gases given off by the fuel**
- F23B 80/02      . by means for returning flue gases to the combustion chamber or to the combustion zone
- F23B 80/04      . by means for guiding the flow of flue gases, e.g. baffles
- F23B 90/00**      **Combustion methods not related to a particular type of apparatus**

**NOTE**

Groups [F23B 90/00](#) - [F23B 90/08](#) correspond to IPC2012.01

**WARNING**

Groups [F23B 90/00](#) to [F23B 90/08](#) are not complete pending a reorganisation. See also groups [F23B 1/00](#) to [F23B 7/007](#)

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|--------------------------|---|
| F23B 90/02               | <ul style="list-style-type: none"> <li>. Start-up techniques</li> </ul>   |
| F23B 90/04               | <ul style="list-style-type: none"> <li>. including secondary combustion ( in separate combustion chambers <a href="#">F23B 10/02</a> )</li> </ul>             |
| F23B 90/06               | <ul style="list-style-type: none"> <li>. . the primary combustion being a gasification or pyrolysis in a reductive atmosphere</li> </ul>                      |
| F23B 90/08               | <ul style="list-style-type: none"> <li>. . in the presence of catalytic material</li> </ul>   |
| <b>F23B 99/00</b>        | <b>Subject matter not provided for in other groups of this subclass</b>   |
| <b>F23B 2101/00</b>      | <b>Adaptation of combustion apparatus to boilers in which the combustion chamber is situated inside the boiler vessel, e.g. surrounded by cooled surfaces</b> |
| <b>Guidance heading:</b> | <b>Indexing scheme related to adaptation of combustion apparatus to boilers</b>   |
| <b>F23B 2103/00</b>      | <b>Adaptation of combustion apparatus for placement in or against an opening of a boiler, e.g. for replacing an oil burner</b>                                |
| F23B 2103/02             | <ul style="list-style-type: none"> <li>. for producing an essentially horizontal flame</li> </ul>   |
| <b>F23B 2700/00</b>      | <b>Combustion apparatus for solid fuel</b>  |
| F23B 2700/003            | <ul style="list-style-type: none"> <li>. adapted for use in water-tube boilers</li> </ul>   |
| F23B 2700/004            | <ul style="list-style-type: none"> <li>. adapted for use in Tenbrink boilers</li> </ul>   |
| F23B 2700/005            | <ul style="list-style-type: none"> <li>. adapted for use in locomotives</li> </ul>  |
| F23B 2700/006            | <ul style="list-style-type: none"> <li>. Details of locomotive combustion apparatus</li> </ul>  |
| F23B 2700/007            | <ul style="list-style-type: none"> <li>. with pressurised combustion chambers</li> </ul>  |
| F23B 2700/008            | <ul style="list-style-type: none"> <li>. with interchangeable combustion chambers</li> </ul>  |
| F23B 2700/009            | <ul style="list-style-type: none"> <li>. adapted for use in various steam boilers</li> </ul>  |
| F23B 2700/01             | <ul style="list-style-type: none"> <li>. adapted for boilers built up from sections</li> </ul>  |
| F23B 2700/011            | <ul style="list-style-type: none"> <li>. with fuel shaft for steam boilers</li> </ul>   |
| F23B 2700/012            | <ul style="list-style-type: none"> <li>. with predrying in fuel supply area</li> </ul>  |
| F23B 2700/013            | <ul style="list-style-type: none"> <li>. for use in baking ovens or cooking vessels</li> </ul>  |

- F23B 2700/014 . for use in reverberatory furnaces
- F23B 2700/018 . with fume afterburning by staged combustion
- F23B 2700/022 . with various types of fume afterburners
- F23B 2700/023 . with various arrangements not otherwise provided for
- F23B 2700/037 . Burners for solid or solidified fuel, e.g. metaldehyde blocks
- F23B 2900/00      Special features of, or arrangements for combustion apparatus using solid fuels;  
Combustion processes therefor**
- F23B 2900/00001 . Combustion chambers with integrated fuel hopper
- F23B 2900/00003 . Combustion devices specially adapted for burning metal fuels, e.g. Al or Mg
- F23B 2900/00004 . Means for generating pulsating combustion of solid fuel
- F23B 2900/00005 . Means for applying acoustical energy to flame
- F23B 2900/00006 . Means for applying electricity to flame, e.g. an electric field
- F23B 2900/99001 . Retrofitting or converting solid fuel stoves to gas or liquid fuels